REMARKS

In accordance with the foregoing, claims 11 and 28 have been amended. Claims 11 and 13-28 are pending and under consideration.

The sole issue remaining in this application is an obviousness rejection of claims 11 and 13-28 under 35 U.S.C. §103(a) as being obvious over U.S. Patent Publication No. 2003/0069024 to Kennedy in view of U.S. Patent Publication No. 2004/0152471 to MacDonald et al.

Kennedy

The Examiner admits that Kennedy does not disclose using a plurality of reports stored in advance to estimate the position of a subscriber station. Kennedy was summarized in response to the previous Office Action. For the Examiners convenience, this summary is repeated below:

> Kennedy et al. relates to a method for geolocating a wireless mobile unit from a single base station. Paragraph [0023] of Kennedy summarizes this process as follows:
>
> [0023] It is yet a further additional object of the present invention to provide a novel system and method for geolocating a mobile unit from a single base station by measuring certain parameters of the communication signal and pilot signal data of the mobile unit to thereby identify an ambiguous position estimate, compare the ambiguous position estimate with a database of reference ambiguous estimates to thereby determine the geolocation of the mobile unit without having to calculate the geolocation from a mathematical expression containing the measured parameters.
>
> Kennedy describes the process in more detail in paragraphs [0041] and [0042] as follows:
>
> [0041] The time delay equipment 115 is used to determine a range from the base station to a mobile unit. The result is a range ring about the base station. The range ring is a locus of possible locations for the mobile unit based solely on the determined range from the base station. Once a call initiation from a mobile unit is detected, the time delay equipment makes a ranging estimate by known methods. One method would include synchronizing with GPS time and measuring reverse traffic channel signaling to estimate range. Another method would include measuring a two-way ranging by comparing the time of transmitting a message on a forward channel to the time of receipt of a responding message on the reverse channel.
>
> [0042] The differential phase equipment 116 is used to determine a phase

difference of a reverse traffic waveform as it is received by the randomly-located antennas at the base station. The randomly-located antennas are typically antennas that already existed at the base station prior to adding the geolocation overlay equipment and are random in the sense that the antennas are not spaced at calibrated intervals. Since the differential phase measurement being taken uses these randomly-located antennas, the resulting lines of bearing are an ambiguous set of possible radial lines of location from the base station. However, the differential phase measurements are repeatable, a property which the present invention exploits. This technique is different than the aforementioned techniques for direction finding using a calibrated array of antennas. The technique of the present invention yields an ambiguous solution whereas the aforementioned direction finding techniques yield a unique solution for differential phase measurements and that unique solution is used to solve a geometric calculation to locate the mobile unit. The technique of the present invention uses the repeatability of the ambiguous differential phase measurements to compare the real-time measurements taken from a mobile unit with a set of reference measurements as will be described below.

Although not entirely clear, it appears that Kennedy determines an ambiguous position estimate based on signal propagation times. Perhaps this ambiguous position estimate determines the radial distance of the mobile station from the base station.

Kennedy also uses phase delay measurements between randomly located antennae. In Kennedy, it appears that a geometric calculation is avoided by using a look-up table. Perhaps the look-up table includes the phase delay measurements previously achieved at known-GPS positions.

Any timing information in the lookup table is useless if it is compared with the measured timing information therefore a sensible comparison is when the received signal strength is used for looking up in a data table with data based on drive tests which stored the received signal strength and the location determined via a GPS system in this data base. The retrieval and storage of the data through drive tests is not discussed in the reference but is a standard method in the industry. Kennedy talks always about just one measurement whose values are used for the geolocation at this moment in time. There is no storing of data prior to the determination of the geolocation of the mobile station.

Further in paragraph [0042] (at the end) Kennedy mentions the repeatability of the differential phase measurement but these measurements are not stored. They are on-line and fed straight into the comparison block (118) in Figure 3 (paragraph [0043]).

MacDonald

Although not entirely clear, it appears that MacDonald relates to determining a location for the purpose of a handoff. As described below, it seems that the mobile station transmits signal strength. This signal strength is received by two candidate base stations. The two candidate base stations compare the signal strength with a generic database not relating specifically to the mobile station. On the other hand, the claims have been amended to clearly require that the position estimate relates to the same subscriber station that sent the reports.

In paragraph [0014], MacDonald describes that two received signal strength values are compared with at least two predetermined signal strength values which are associated with at least two geographical locations. Because the predetermined signal strength values are associated with geographical locations, the locations must have been known at the time when these signal strength values were determined. Paragraph [0012] of MacDonald describes that these (predetermined) values may be obtained by, for example, signal strength measurements or signal strength computations. MacDonald is not entirely clear regarding how the information is obtained. In one known method, test signals are transmitted from known locations, and these test signals are received by the base stations and stored as doublets (location and signal strength) in a database. These signal strength values are therefore predetermined. Another known method to obtain the reference database is to use radio planning tools which provide calculated received signal strength values at each location.

Because it is difficult or impossible to always use a known location or a planning tool to locate a mobile station, MacDonald also requires an actual measurement process. That is, an actual measurement process is compared with known or planning tool information. The location of the mobile station is unknown and is determined by referring to signal strength values stored in a database. The stored signal strength values were not transmitted by the same mobile station that transmits the signals used for determining the location. The claims require that the position estimation be performed for the same subscriber station from which the reports were received. These reports are missing from MacDonald.

With regard to the "attachment points" mentioned in MacDonald, paragraph [0013] describes that the mobile station is associated with two attachment points, i.e. base stations. This is emphasized by the last sentence in paragraph [0014] "the reported and received strength values relate to mobile-assisted hand-off." Therefore, there are two measurements of signal strength, one for each base station or attachment point.

The Examiner relies upon MacDonald for storing reports in advance. However, this feature is missing from the reference.

Combination of Kennedy and MacDonald

The Examiner argues that it would have been obvious for Kennedy to store reports in advance. However, as mentioned throughout the reference, Kennedy relies on just a single base station. This is why Kennedy also refines the rough location using phase delay measurements and what appears to be a look-up table. If Kennedy stored a plurality of reports in advance, it is questionable what use these earlier reports would have. Perhaps the earlier reports could be averaged with the most recent reports. However, this would increase complexity and decrease accuracy in the position estimate. That is, an average past position would be determined, not a current position.

Kennedy does not store information from the mobile station in advance. Kennedy refers to a database without mentioning how the entries in the database are obtained. It is unknown what the mobile location module does with the location estimate of the mobile station. This information can either be sent to the mobile station or used within the network, for example, for emergency services.

Kennedy has no need to store the claimed reports in advance, especially when Kennedy relies on just a single base station. Even if the claimed reports would be very helpful to Kennedy, MacDonald does not disclose or suggest this feature. For all of the above reasons, the prior art rejections should be withdrawn.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

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By: _____
Mark J. Henry
Registration No. 36,162

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501